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Hotel Management System

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I Team Members

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1-Overview of System Design & Architecture:

This Hotel Management System is designed to automate and streamline the operations of a hotel by providing a user-friendly interface for managing room bookings, check-ins, check-outs, billing, and inventory. The system supports 300 rooms categorized into three types (Single, Queen, King), each with distinct pricing, and allows guests to book, modify, or cancel reservations while ensuring data integrity through input validation (e.g., name format, date checks). Key features include automated billing based on stay duration, real-time room availability tracking, and seamless check-in/out processes. All data is stored in a CSV file (HotelManagement.csv) for easy access and reporting. Built in C++, the system leverages file handling, enumerated types, and modular functions to deliver an efficient, scalable solution for hotel administrators and guests alike.

1.1 Modules Overview

- **Main Module:** Controls program flow and menu navigation
- **Booking Module:** Handles room reservations with date validation
- **File I/O Module:** Manages CSV data storage (HotelManagement.csv)
- **Validation Module:** Verifies dates, names, and room availability
- **Billing Module:** Calculates charges based on stay duration

1.2 Data Structures Used

Structure / Type	Purpose
Struct Room	Stores room details (number,beds,price,booking status,etc.)
Enum Beds	Define bed types(single/queen/king)
Enum PaymentMethod	PaymentMethod lists payment options (cash, visa) without explicit values, defaulting to 1,2.
1D Array rooms [SIZE]	Array of type Room that stores all room data (Capacity:300 rooms)

1.3 Requirements for compilation

I Hardware Requirements

Component	Minimum Specification	Recommended
Processor	1 GHz x86/x64	2GHz+
RAM	512 MB	1GB+
Storage	10 MB free space	50 MB+

II Software requirements

- Operating system: windows 7/10/11(32-bit or 64-bit)
- C++ standard library (automatically included)

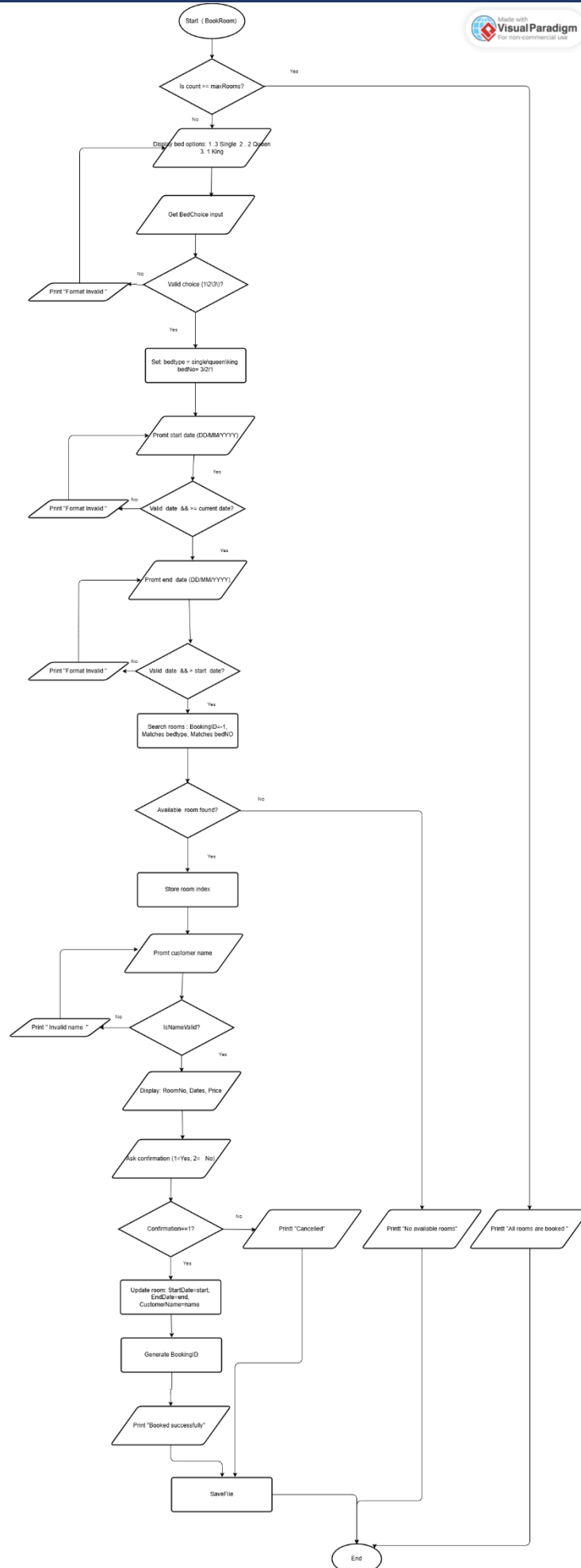
2- Functions:

Function	Purpose
BookRoom ()	manages the entire booking workflow, from verifying availability and validating dates to confirming reservations and updating records. It ensures proper room assignment, generates unique booking IDs, and persists data to a CSV file while providing user feedback at each stage.
DeleteRoom()	cancels bookings by verifying guest identity and room ownership, then clears reservation data if valid. It updates the CSV file upon successful cancellation or displays error messages if invalid.
AddRoom ()	function enables administrators to expand the hotel's room inventory by adding new rooms (with details like number, beds, type, and price) when under capacity limits, automatically saving them to a CSV file. If maximum capacity is reached, it displays an error instead.
SaveToFile()	exports room data to a CSV file by writing each room's details (number, type, etc.) in a structured format with headers, ensuring compatibility with spreadsheet programs. It handles file opening errors and confirms successful saves with status messages.
CalculateBill ()	computes a guest's total charges by validating their name, finding all their active bookings, and calculating costs based on stay duration and room rates. It provides an itemized bill or an error message if no bookings exist.
CalculateDaysStayed()	function estimates the duration between two dates by converting each date into an approximate day count ($\text{year} \times 365 + \text{month} \times 30 + \text{day}$) and returning the difference. While this method provides a rough calculation by assuming fixed 30-day months and 365-day years, it doesn't account for actual month lengths or leap years.
intToBedType()	converts a numerical bed type value (3, 2, or 1) into its corresponding string representation ("Single", "Queen", or "King"), returning "Unknown" for any other input value. This provides human-readable bed type labels for display or storage purposes.
DateIsValid()	function checks if a date string matches the "DD/MM/YYYY" format and contains valid day (1-31), month (1-12), and year (≥ 0) values, returning true only if all conditions are met. Otherwise, it returns false.
IsValidName ()	The function validates names by rejecting the string "___" and ensuring all characters are either letters or spaces, returning true only if both conditions are met.

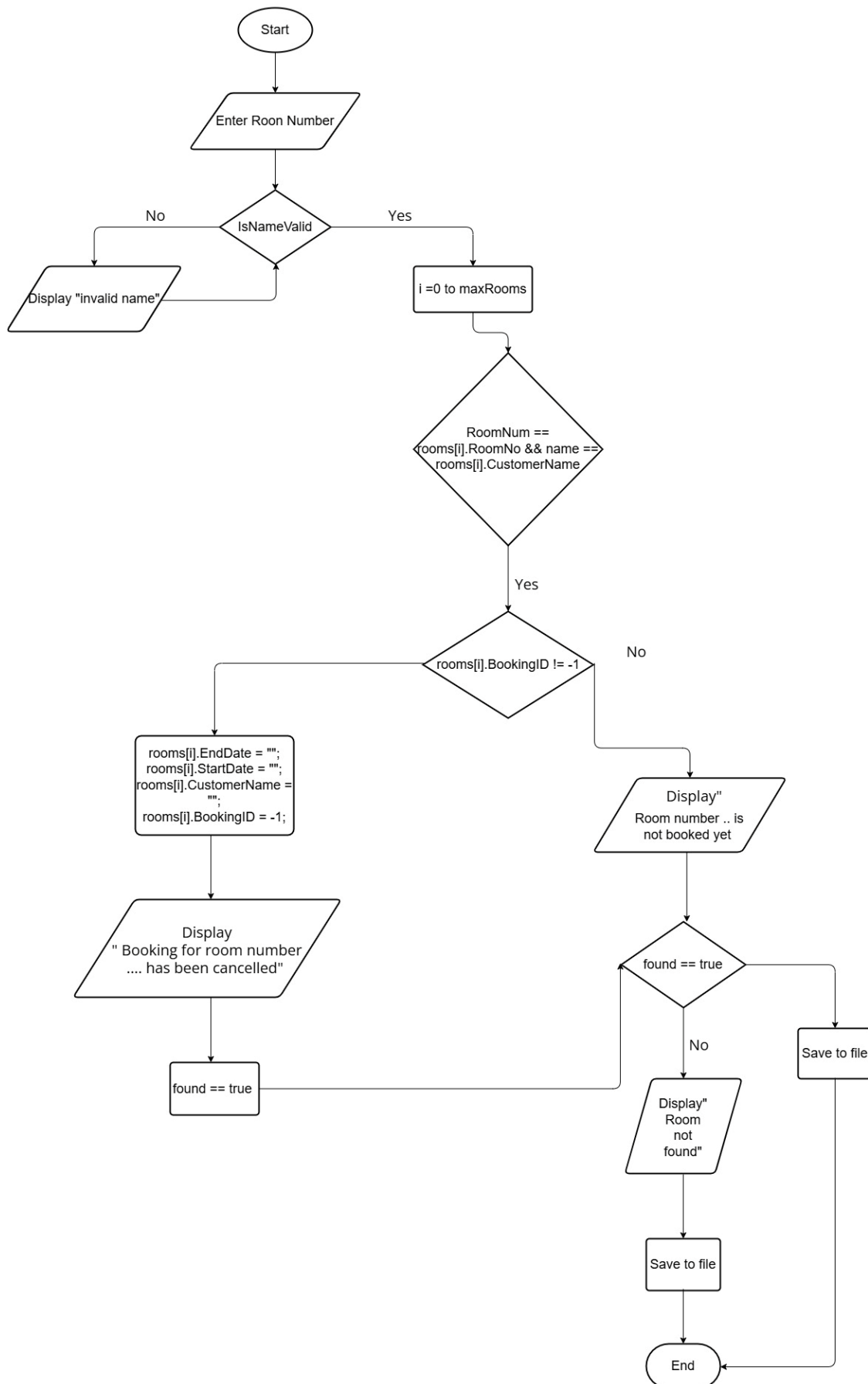
EndDateValid()	checks if an end date occurs after a start date by comparing their year, month, and day components sequentially. It returns false if the end date is earlier than or equal to the start date, ensuring chronological validity.
IsDateWithinBooking()	verifies if a given date falls between a booking's start and end dates by comparing their year, month, and day components sequentially. It returns true only if the date is within the valid range, ensuring it's neither before the start nor after the end of the booking period.
CompareWcurrentDate()	function verifies if a given date is in the future by comparing its year, month, and day components against the current date, returning true only if the input date is later. Otherwise, it returns false.
CheckIn()	handles guest check-ins by verifying their identity and listing valid bookings, then updates room statuses upon selection while managing errors for invalid entries. It persists changes to a CSV file to maintain accurate records.
CheckOut()	handles guest check-outs by verifying identity, processing room selections, and resetting occupied rooms to available status, while validating inputs and auto-saving updates. It provides error feedback for invalid attempts and ensures accurate record-keeping through CSV persistence.
Buildhotel()	initializes 300 rooms into three categories: single-bed (first 100 rooms at \$400/night), queen-bed (next 100 at \$500/night), and king-bed (last 100 at \$600/night), all with unique numbers and default unbooked/unchecked-in statuses.

3-Flowcharts

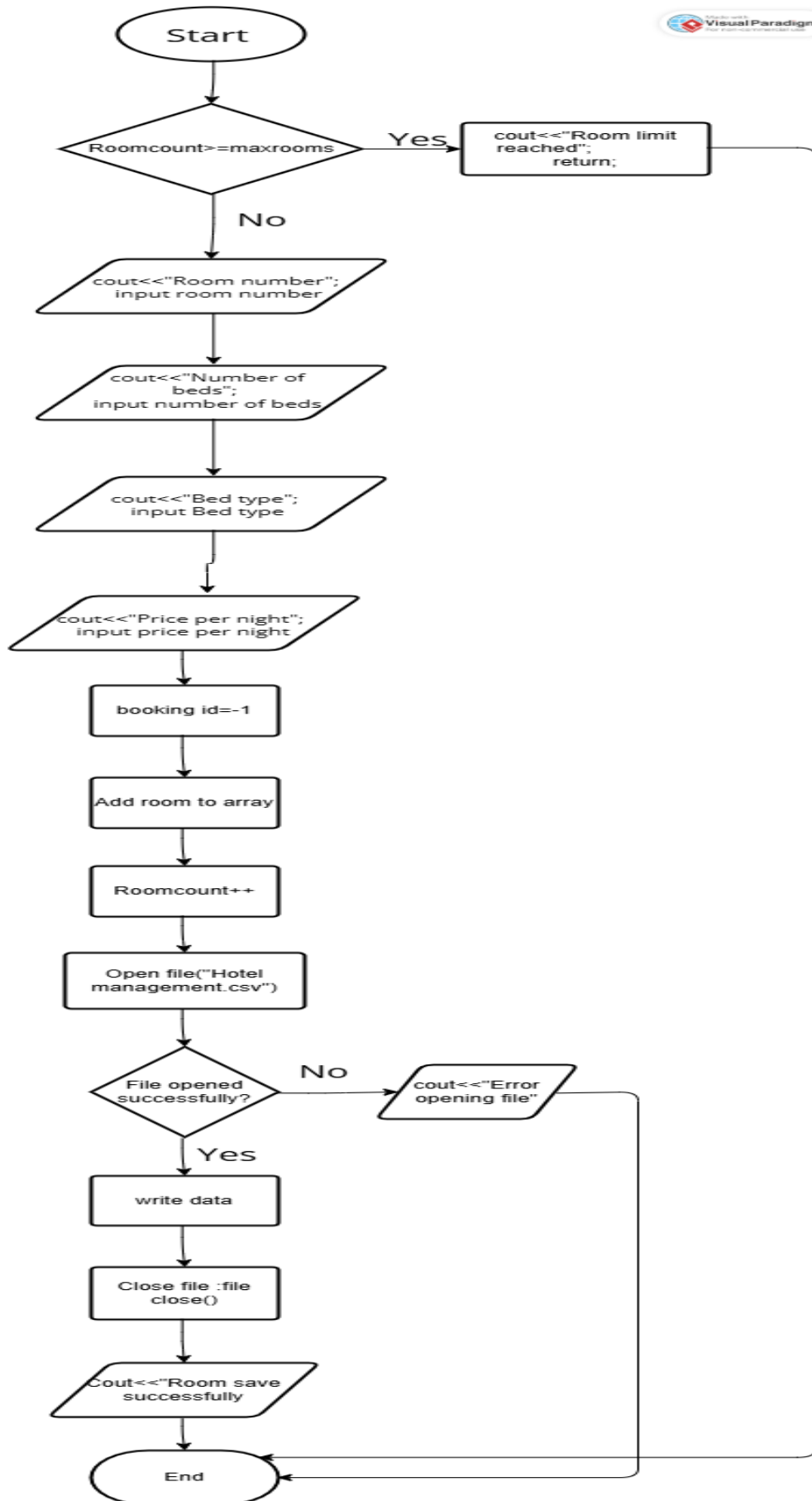
Book Room:



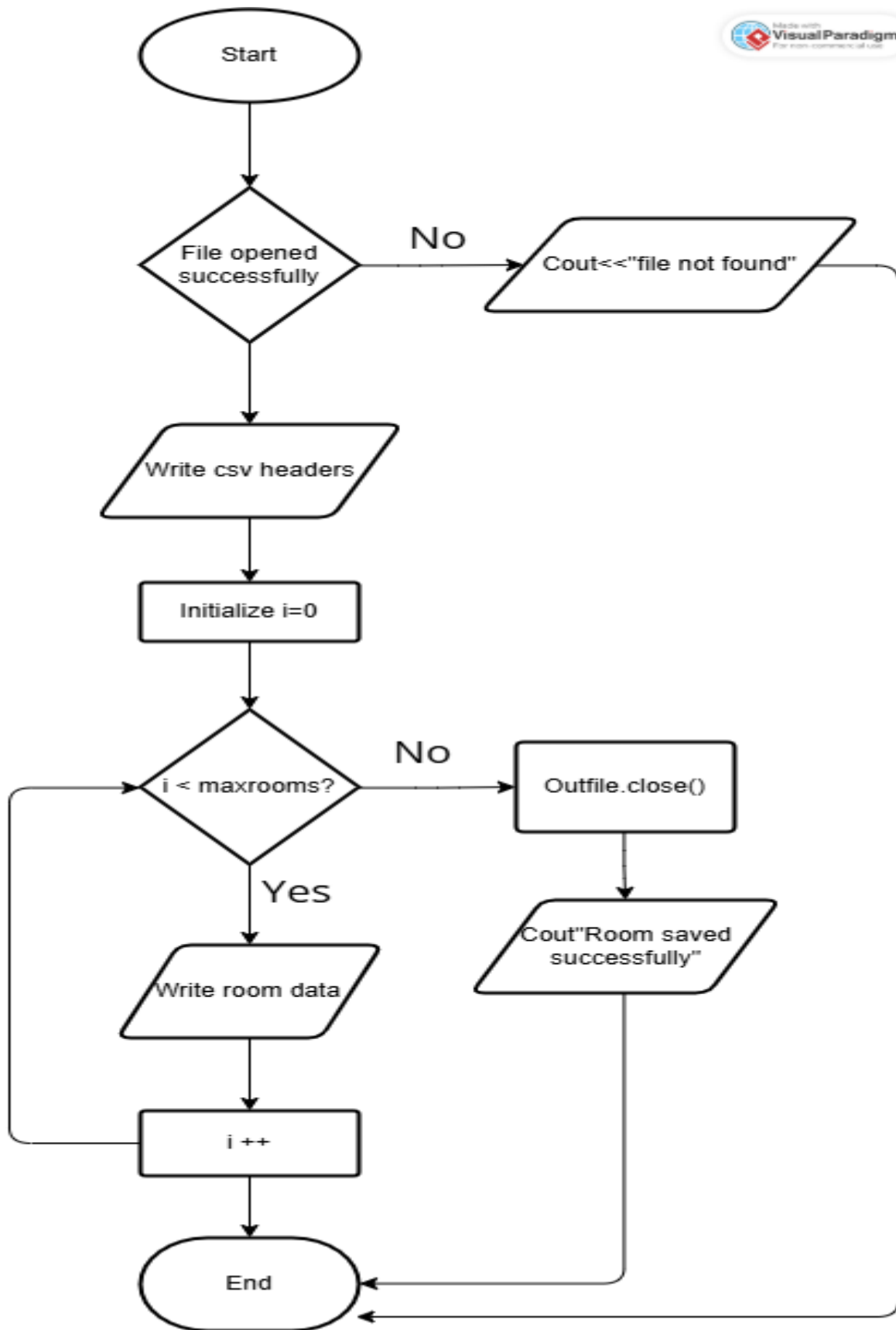
Delete Room:



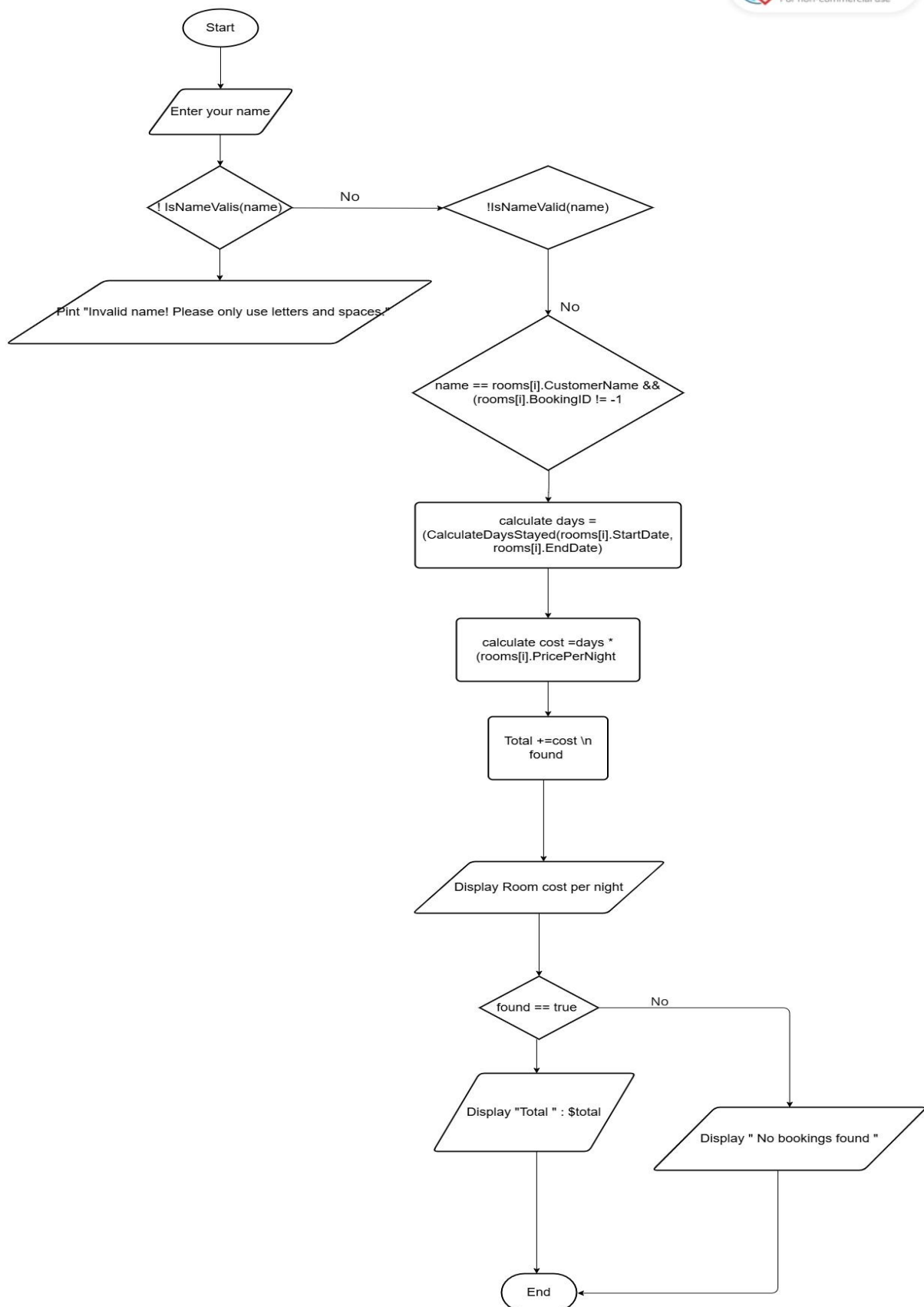
Add Room:



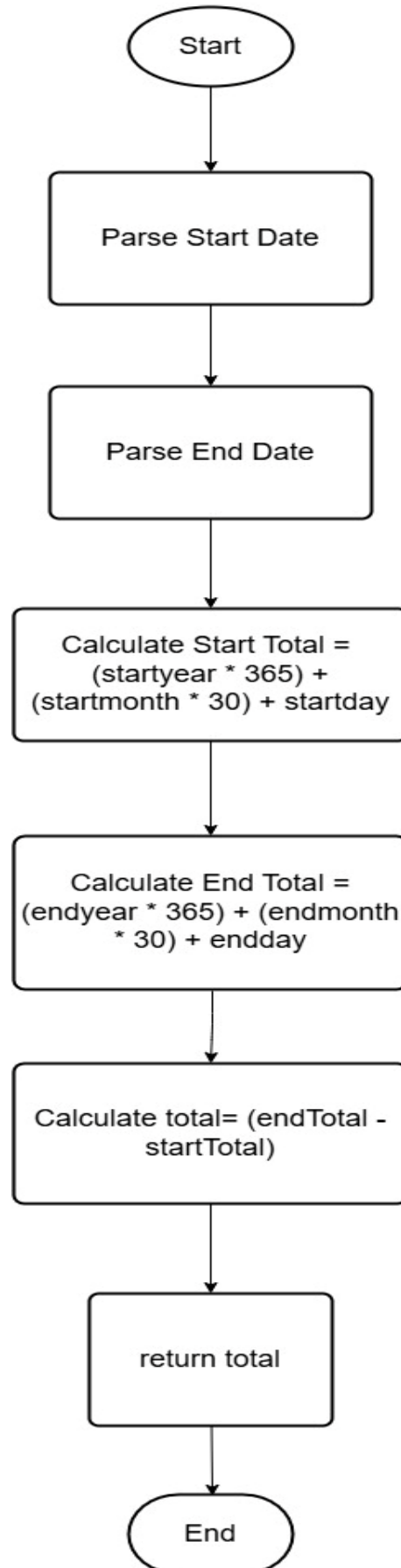
Save to file:



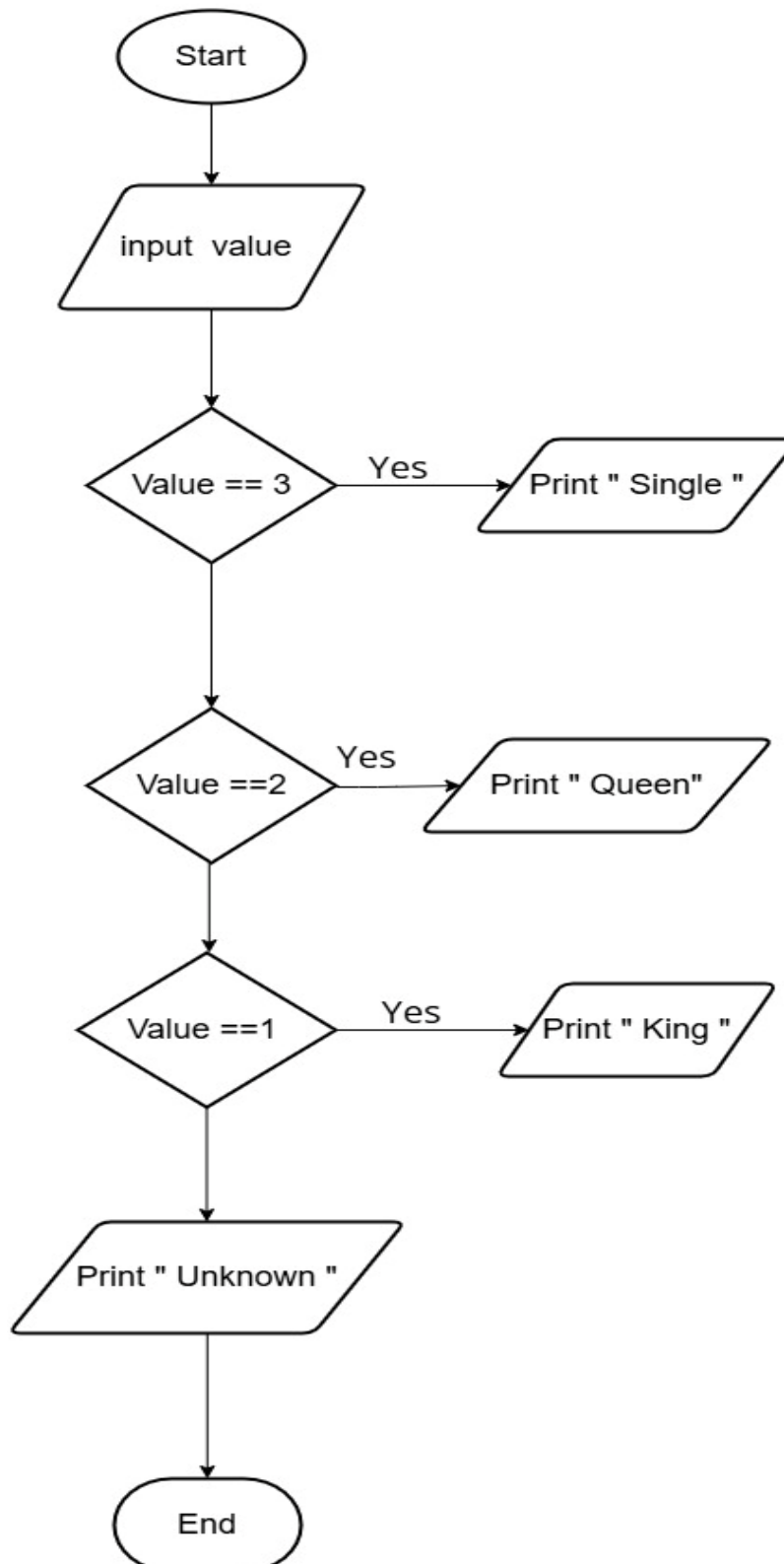
Calculate Bill:



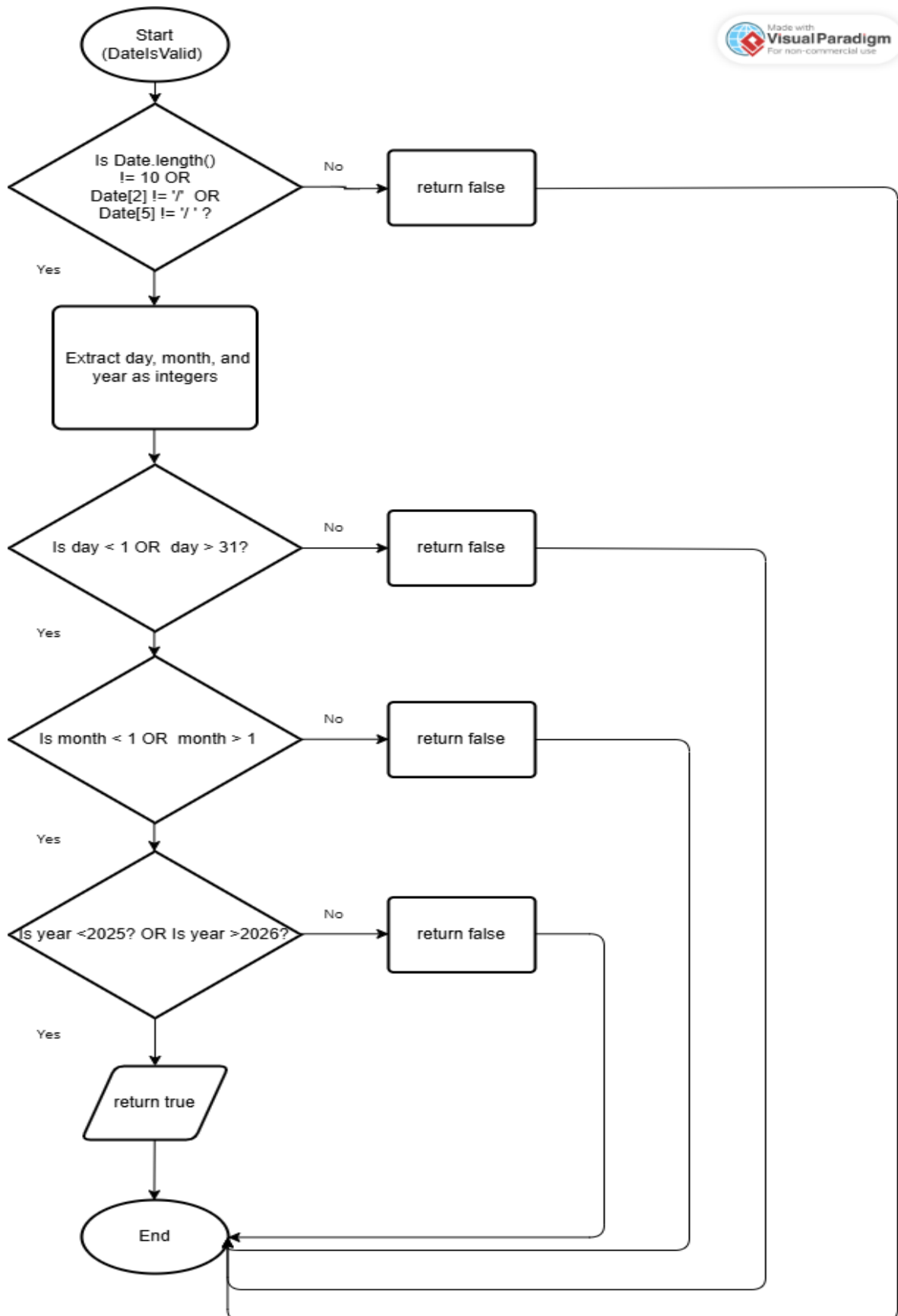
Calculate days stayed:



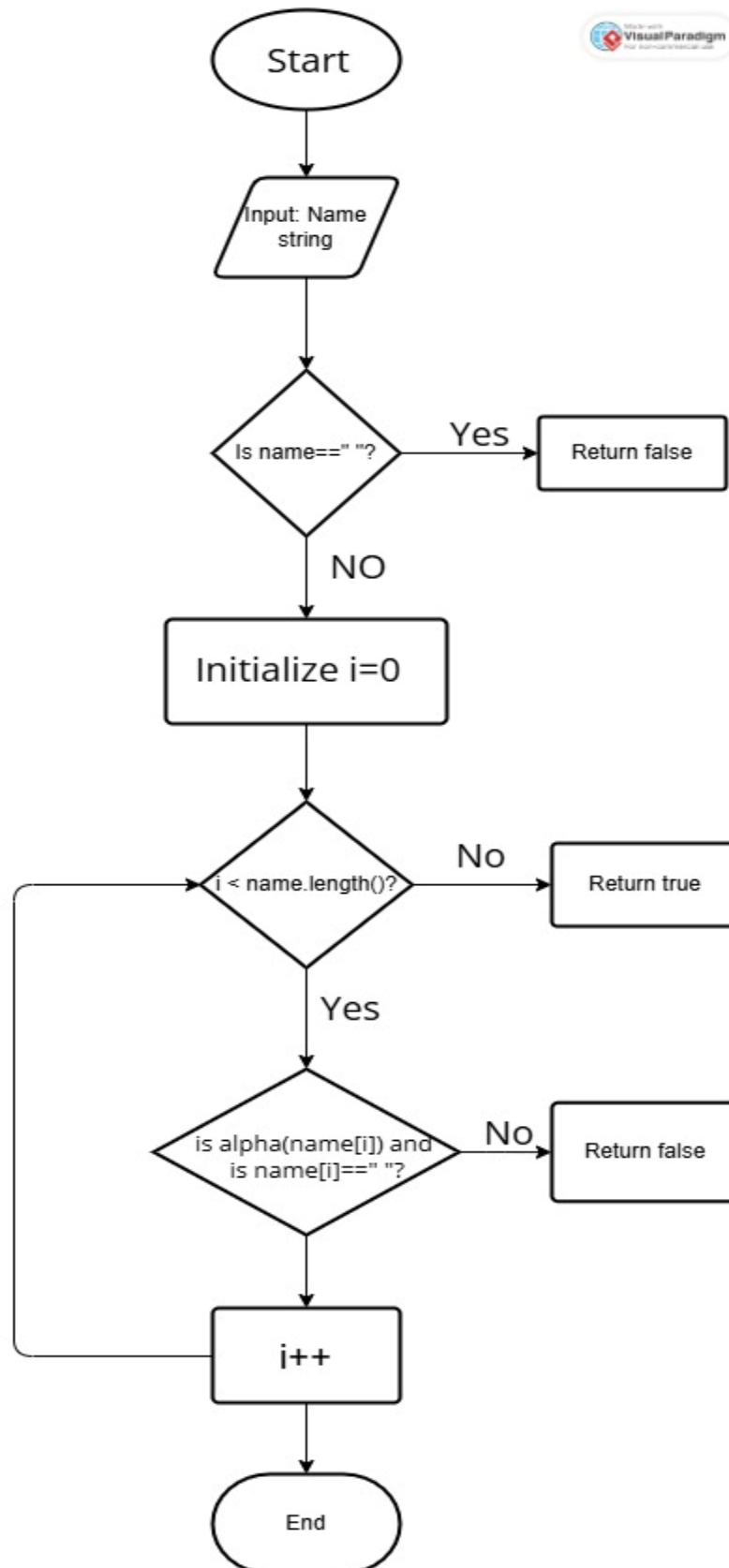
Int To bed type:



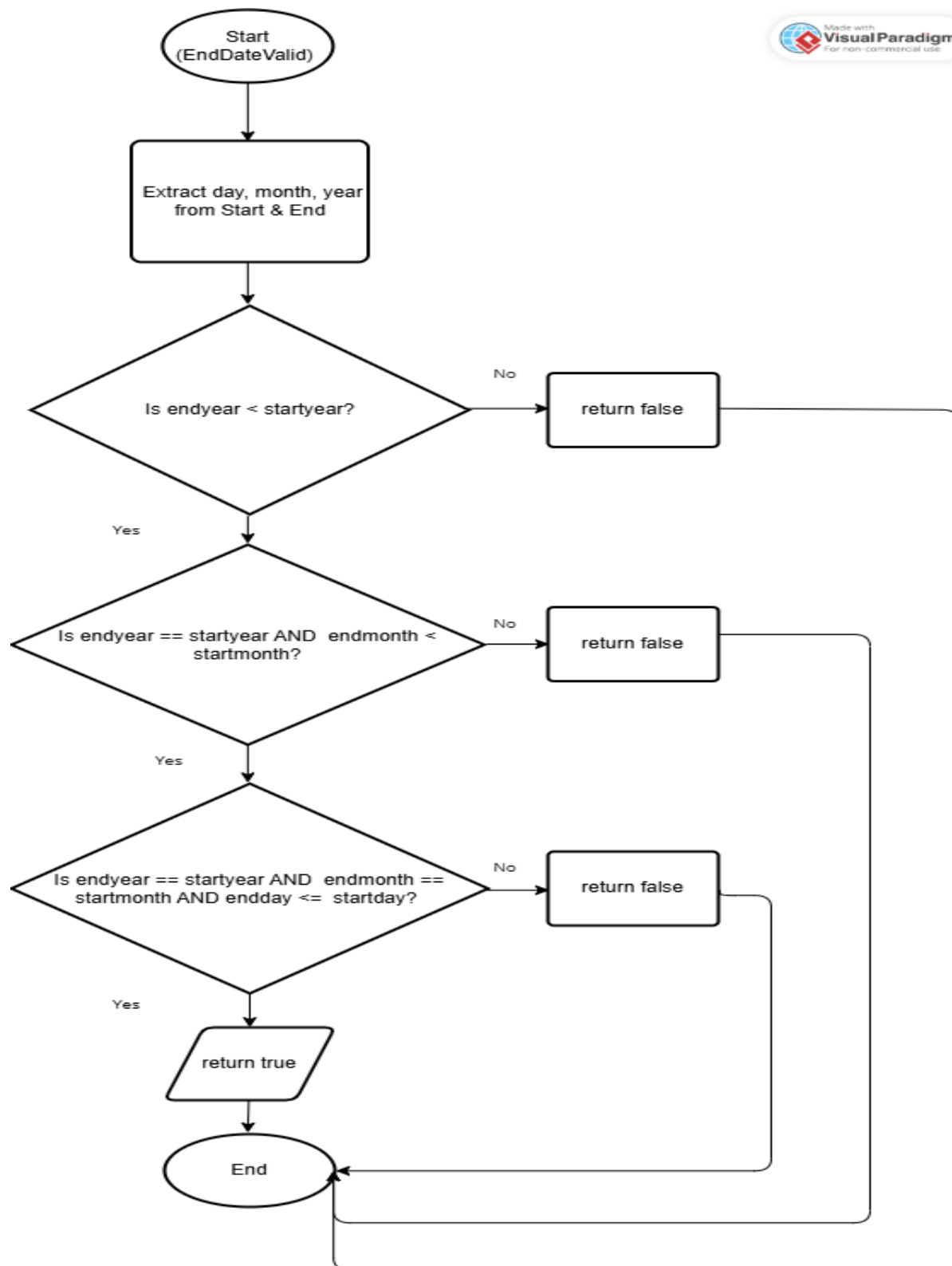
Date Is valid:



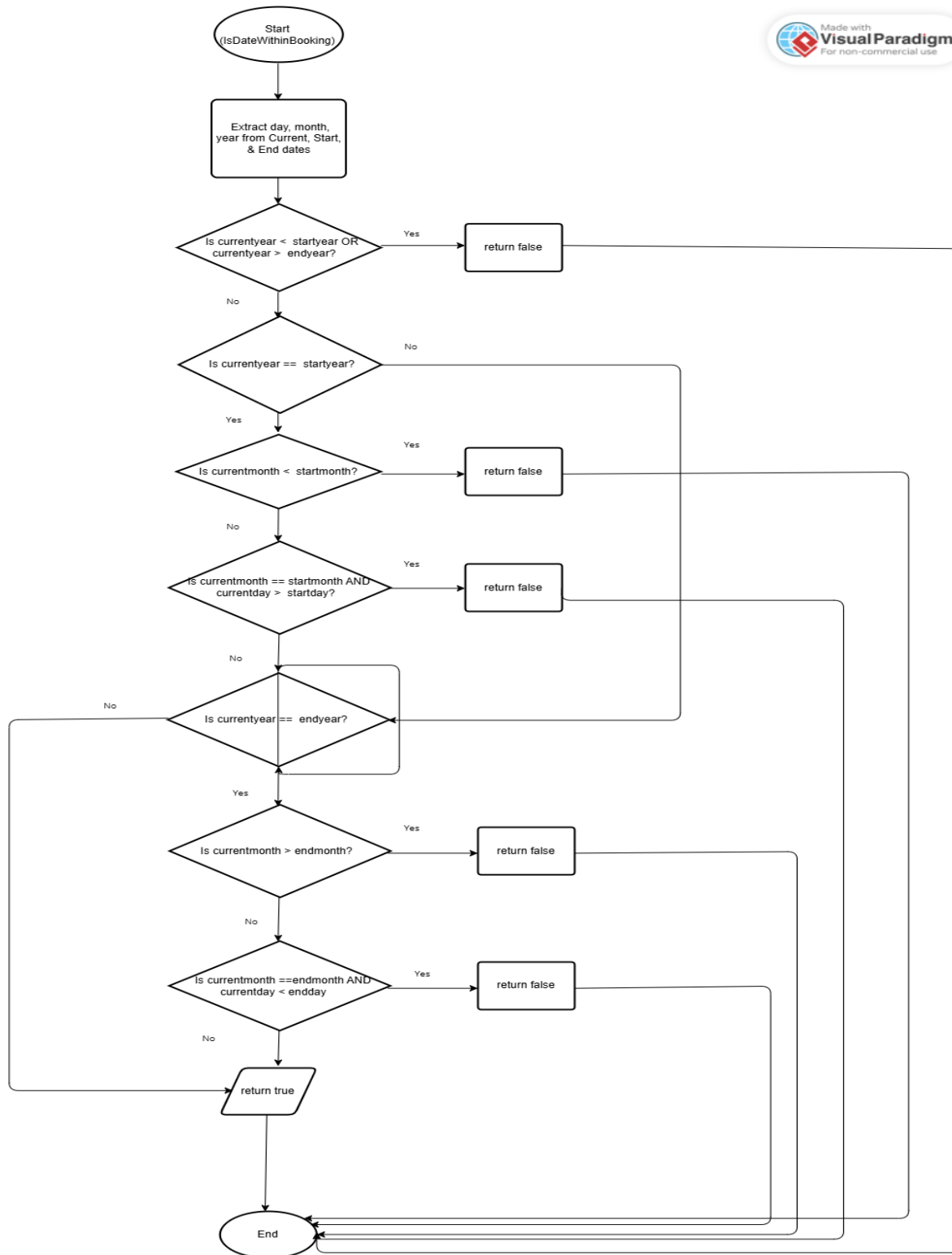
Is name valid:



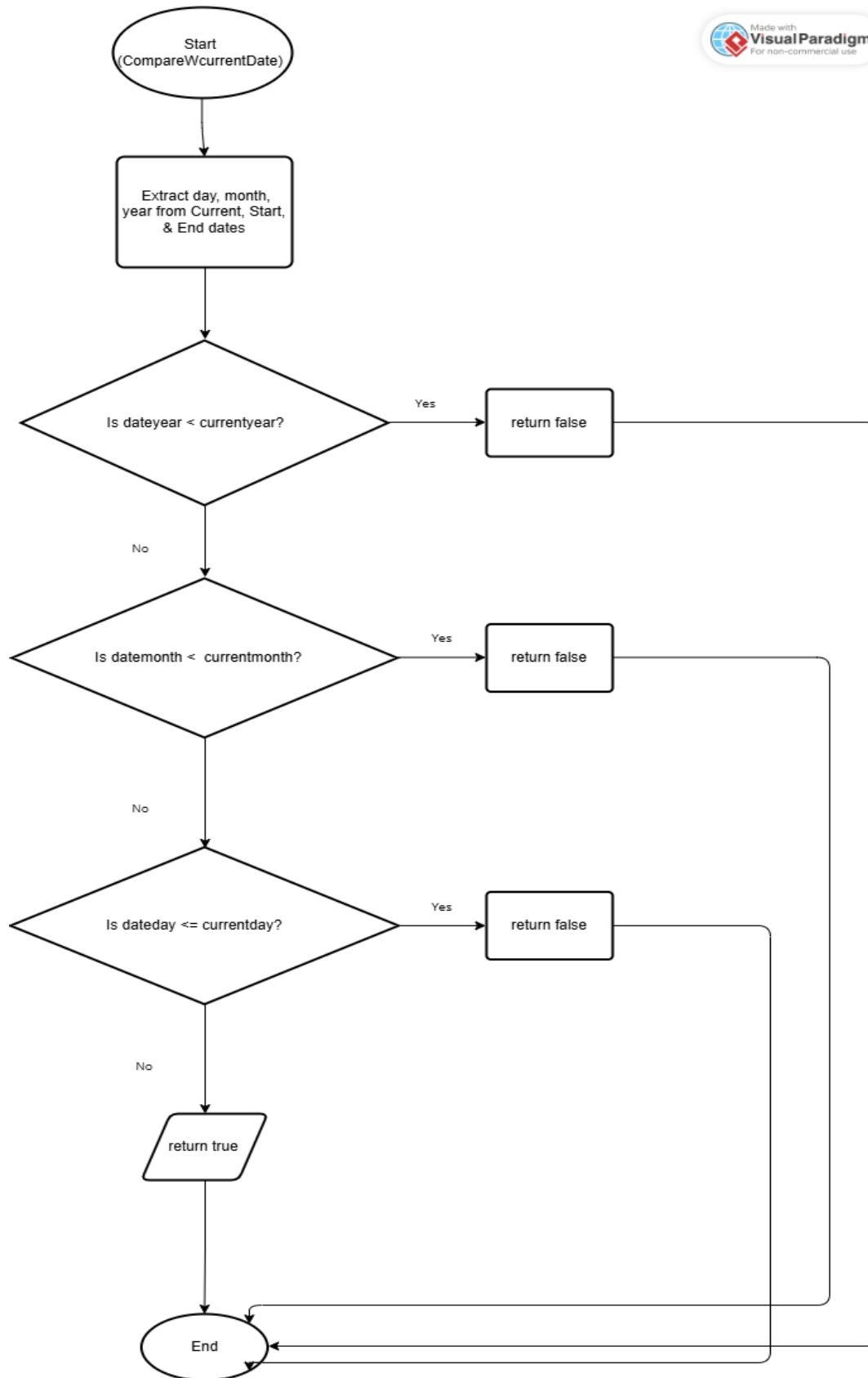
End date valid:



Is Date within Booking:

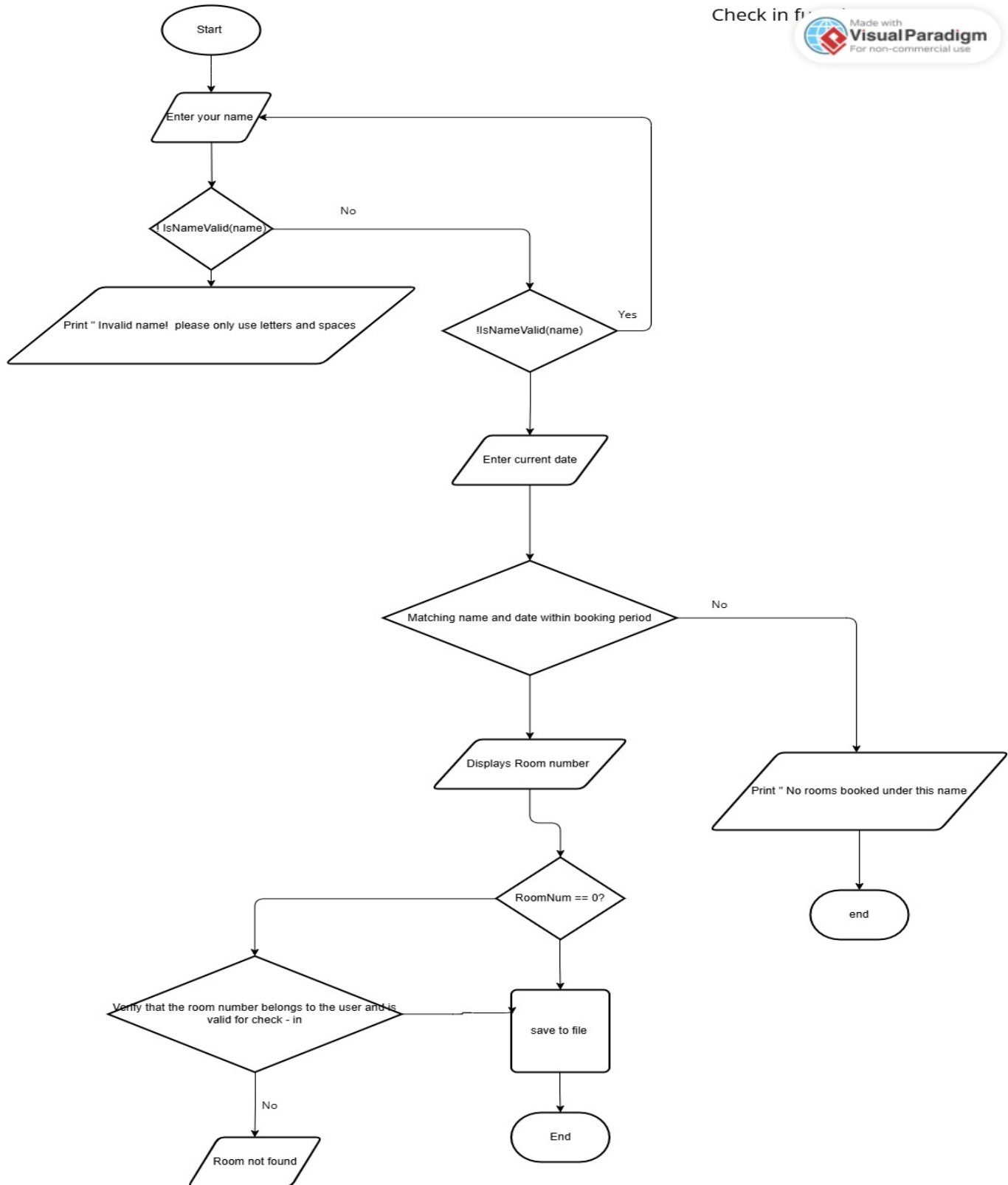


Compare w Current Date:

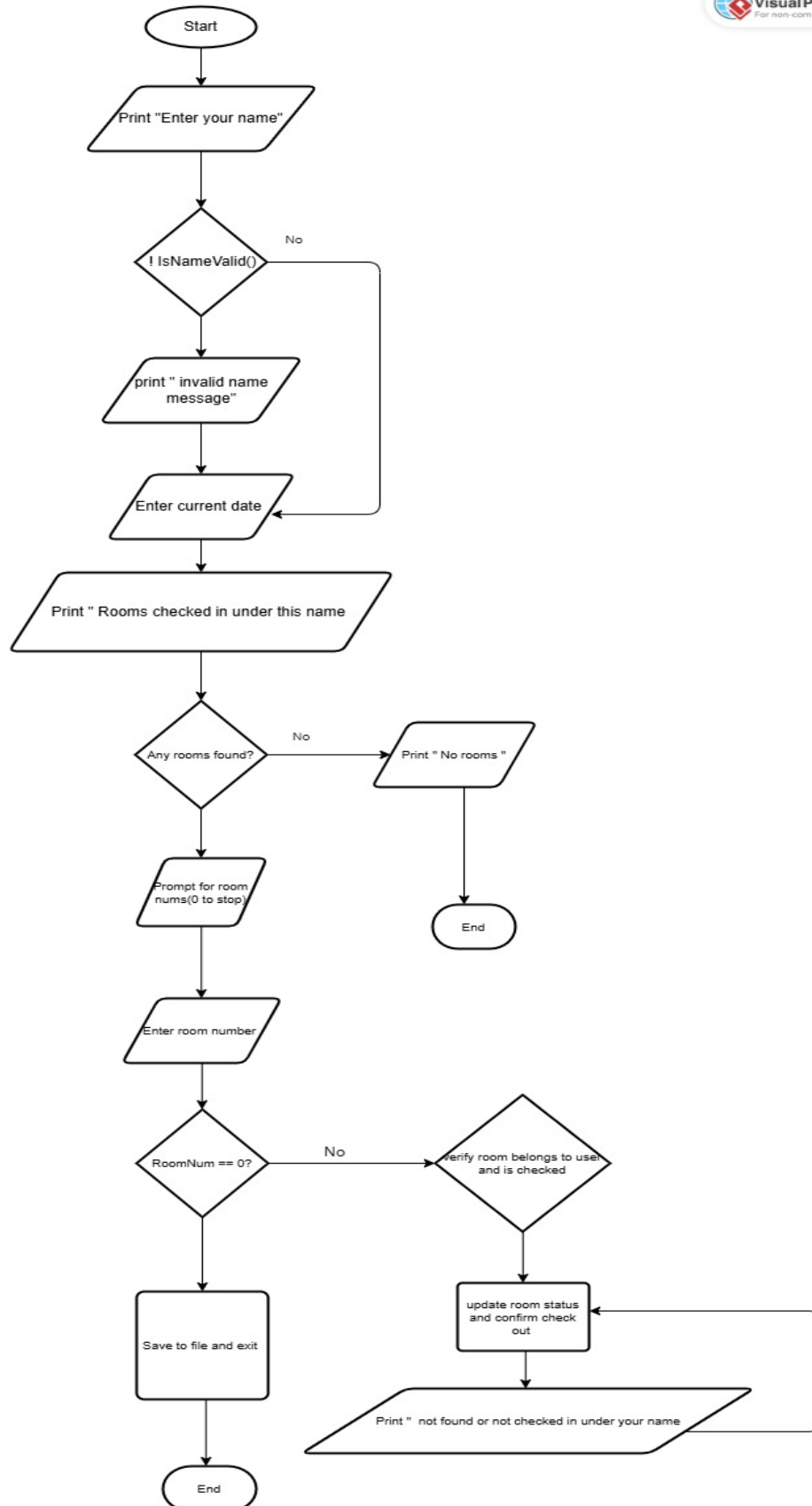


Check In:

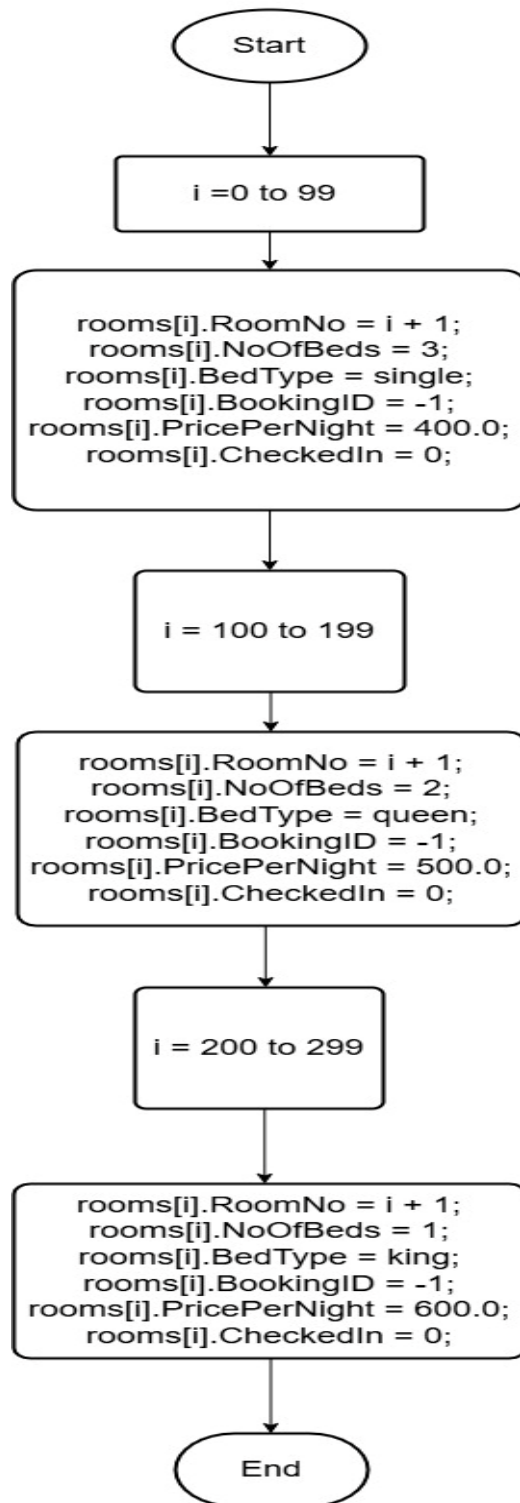
Check in flow



Check Out:



Build hotel



3-Input and output test cases

I Book Room

```
C:\Users\Nadine\source\repo: X + v

Rooms saved to file successfully.
Please enter the current date in the following format:
dd/mm/yyyy: 13/12/2025

Welcome to Hotel Management System!
Please select an option:
1 : Book Room
2 : Add Room
3 : Delete Room
4 : Save Inventory to File
5 : Check in
6 : Check out
7 : Calculate Bill
8 : Exit
Enter your choice: 1
Please Enter type of bed
1. 3 Single Beds
2. 2 Queen Beds
3. 1 King Bed
3
Please Enter start stay date(Format: DD/MM/YYYY):
14/12/2025
Please Enter end date(Format: DD/MM/YYYY):
17/12/2025
Enter your name: Nadine
Available room found:
Room number: 201
From: 14/12/2025 To: 17/12/2025
Confirm booking? (1 for Yes / 2 for No):
1
Room Booked Successfully!
Rooms saved to file successfully.
```

R210										
	A	B	C	D	E	F	G	H	I	
1	Room No.	Bed Type	No. of Beds	Price / Night	Booking ID	Customer Name	CheckedIn?	Start Date	End Date	
202	201	King	1	\$600	2601	Nadine	0	14/12/2025	17/12/2025	
203	202	King	1	\$600	-1		0			
204	203	King	1	\$600	-1		0			
205	204	King	1	\$600	-1		0			
206	205	King	1	\$600	-1		0			
207	206	King	1	\$600	-1		0			
208	207	King	1	\$600	-1		0			
209	208	King	1	\$600	-1		0			
210	209	King	1	\$600	-1		0			
211	210	King	1	\$600	-1		0			
212	211	King	1	\$600	-1		0			

II Add Room

The screenshot displays a terminal window titled 'C:\Users\Nadine\source\repo:' with a command prompt interface. The terminal shows the following sequence of operations:

```
Rooms saved to file successfully.  
Please enter the current date in the following format:  
dd/mm/yyyy: 19/09/2025  
  
Welcome to Hotel Management System!  
Please select an option:  
1 : Book Room  
2 : Add Room  
3 : Delete Room  
4 : Save Inventory to File  
5 : Check in  
6 : Check out  
7 : Calculate Bill  
8 : Exit  
Enter your choice: 2  
Enter Room Number: 301  
Enter Number of Beds: 3  
Enter Bed Type (3 = Single, 2 = Queen, 1 = King): 3  
Enter Price per Night: 950  
Room added successfully and saved to file.
```

Below the terminal window, an Excel spreadsheet is visible. The spreadsheet has a header row with columns A through M. The data entered is as follows:

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Room No.	Bed Type	No. of Bed	Price / Night	Booking ID	Customer	Checked In	Start Date	End Date				
302	301	Single	3	\$950	-1								
303													
304													
305													

III Delete Room

```
Welcome to Hotel Management System!
Please select an option:
1 : Book Room
2 : Add Room
3 : Delete Room
4 : Save Inventory to File
5 : Check in
6 : Check out
7 : Calculate Bill
8 : Exit
Enter your choice: 3
Please enter room number201
Enter your name: nadine
Booking for Room Number: 201 has been cancelled!
Rooms saved to file successfully.
```

IV Save Inventory to File

```
Welcome to Hotel Management System!
Please select an option:
1 : Book Room
2 : Add Room
3 : Delete Room
4 : Save Inventory to File
5 : Check in
6 : Check out
7 : Calculate Bill
8 : Exit
Enter your choice: 4
Rooms saved to file successfully.
```

V Check In

```
Welcome to Hotel Management System!
Please select an option:
1 : Book Room
2 : Add Room
3 : Delete Room
4 : Save Inventory to File
5 : Check in
6 : Check out
7 : Calculate Bill
8 : Exit
Enter your choice: 5
Enter your name: nadine
Enter current date: 14/12/2026
Rooms booked under this name:
Room Number: 201
Enter the Room Numbers you would like to check in(enter 0 to stop)
Room Number: 201
You have successfully checked in to room 201
Room Number: 0
Rooms saved to file successfully.
```

K207

	A	B	C	D	E	F	G	H	I	J
1	Room No.	Bed Type	No. of Bec	Price / Nig	Booking ID	Customer	CheckedIn	Start Date	End Date	
202	201	King	1	\$600	2633	nadine	1	13/12/2026	18/12/2026	
203	202	King	1	\$600	-1		0			
204	203	King	1	\$600	-1		0			

VI Check Out

```
Welcome to Hotel Management System!
Please select an option:
1 : Book Room
2 : Add Room
3 : Delete Room
4 : Save Inventory to File
5 : Check in
6 : Check out
7 : Calculate Bill
8 : Exit
Enter your choice: 6
Enter your name: nadine
Enter current date: 14/12/2026
Rooms Checked in under this name:
Room Number: 201
Enter the Room Numbers you would like to check out (enter 0 to stop)
Room Number: 201
You have successfully checked out of room 201
Room Number: 0
Rooms saved to file successfully.
```

J204	⌵	:	✕	✓	<i>fx</i>					
	A	B	C	D	E	F	G	H	I	
1	Room No.	Bed Type	No. of Bec	Price / Nig	Booking IC	Customer	CheckedIn	Start Date	End Date	
202	201	King	1	\$600	-1		0			
203	202	King	1	\$600	-1		0			
204	203	King	1	\$600	-1		0			
205	204	King	1	\$600	-1		0			

VII Calculate Bill

```
Welcome to Hotel Management System!
Please select an option:
1 : Book Room
2 : Add Room
3 : Delete Room
4 : Save Inventory to File
5 : Check in
6 : Check out
7 : Calculate Bill
8 : Exit
Enter your choice: 7
Enter your name: nadine
Room 1: 6 nights x $400 = $2400
Your total is: $ 2400
Choose payment method:
1. Cash
2. Visa
Enter your choice (1 or 2): 2
Enter your Visa card number (16 digits): 1234567890123456
Payment of $2400 was successful using Visa ending in 3456.
```


VIII Exit Program

```
Microsoft Visual Studio Debu  X + v
Rooms saved to file successfully.
Please enter the current date in the following format:
dd/mm/yyyy: 19/09/2025

Welcome to Hotel Management System!
Please select an option:
1 : Book Room
2 : Add Room
3 : Delete Room
4 : Save Inventory to File
5 : Check in
6 : Check out
7 : Calculate Bill
8 : Exit
Enter your choice: 8
Program terminated
C:\Users\Nadine\source\repos\SWTest_01\x64\Debug\SWTest_01.exe (process 42956) exited with code 0 (0x0).
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the console when debugging stops.
Press any key to close this window . . .|
```

IX Corner Cases

```
C:\Users\Nadine\source\repo: X + v
Rooms saved to file successfully.
Please enter the current date in the following format:
dd/mm/yyyy: nasjdb
Invalid Date Format! Please try again : 12/20/1990
Invalid Date Format! Please try again : 1/1/1
Invalid Date Format! Please try again : hello
Invalid Date Format! Please try again : hi/ki/si
Invalid Date Format! Please try again : 19/12/2025

Welcome to Hotel Management System!
Please select an option:
1 : Book Room
2 : Add Room
3 : Delete Room
4 : Save Inventory to File
5 : Check in
6 : Check out
7 : Calculate Bill
8 : Exit
Enter your choice: |
```